

THE IDENTITY OF *QUADRACEPS CRASSIPEDALIS* (HARRISON)
AND TWO NEW SPECIES OF *QUADRACEPS*
(MALLOPHAGA: PHILOPTERIDAE)

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Abstract.—The identity of *Quadriceps crassipedalis* (Harrison) is clarified by a redescription and illustrations from specimens taken off the type-host *Thinocorus rumicivorus*. Two new species are described and illustrated: *Quadriceps ruficollis* off *Oreopholus ruficollis* in Argentina and Chile and *Q. rubricollis* off *Charadrius rubricollis* in Tasmania, Australia.

Species of the mallophagan genus *Quadriceps* Clay and Meinertzhagen are found mostly on hosts of the avian order Charadriiformes (Plovers, Sandpipers, Snipes, Gulls, Terns, etc.) where they live on the wing feathers. The Charadriiformes presently contains over 300 species, of which it is estimated that 240 are likely to be hosts to species of *Quadriceps* sensu stricto; at the present time about 100 species and subspecies of *Quadriceps* have been recorded on 147 species of hosts. Herewith, we clarify the status of one species which has been in doubt for a century and we describe and illustrate two new species.

All measurements are in millimeters. Scientific names of the hosts are from Peters (1934). Paratypes of the new species will be distributed, as quantities permit, to the collections of the authors, the National Museum of Natural History, Washington, D.C., and the British Museum (Natural History), London.

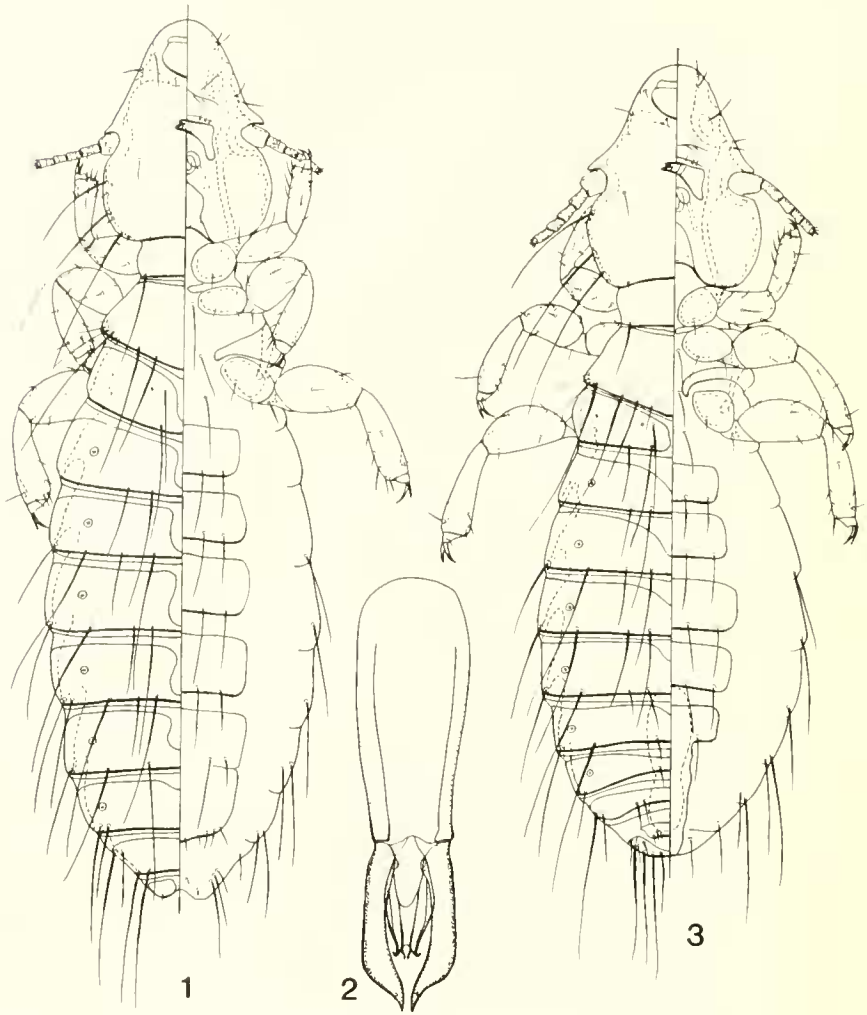
Quadriceps crassipedalis (Harrison)

Figs. 1-3

Nirmus crassipes Piaget, 1885: 30 (*nec* Denny, 1852: 21). Type-host: *Thinocorus rumicivorus* Eschscholtz, the Lesser Seedsnipe.

Degeeriella crassipedalis Harrison, 1916: 111. *Nomen novum* for *Nirmus crassipes* Piaget, 1885 (*nec* Denny, 1852).

Male.—External morphology and chaetotaxy as in Fig. 3. Head broadest across temples, with preantennal region tapered and evenly rounded; dorsal anterior plate with flattened anterior margin; temple with 3 very long marginal setae on each side; antennae essentially filiform, but with somewhat enlarged basal segment; temple width, 0.38; head length, 0.46. Pronotum with 1 long seta at each latero-posterior corner; each side of pteronotum with 7 short to very long marginal setae; pronotum width, 0.23; pteronotum width, 0.38. Abdomen with tergite II (= first apparent tergite) completely divided at midline, tergites III-VII deeply indented medioanteriorly, VIII more gently narrowed medially, and IX evenly narrowed.



Figs. 1-3. *Quadraceps crassipedalis*. 1, Female. 2, Male genitalia. 3, Male.

Marginal tergal setae: II-III, 4; IV-VI, 8; VII, 6; VIII, 4; IX, 8; posterior margin of abdomen with row of very long setae. Quadrangular sternal plates on III-VI, each with 4 marginal setae; subgenital plate extending from VII to end of abdomen. Abdomen width, 0.58; total body length, 1.67. Genitalia (Fig. 2) with basal plate about twice length of parameres; parameres stout, tapered to point posteriorly, with subapical very short seta; mesosomal structures as shown; genitalia length, 0.33; genitalia width, 0.07.

Female.—External morphology and chaetotaxy as in Fig. 1. Much as for male, except as follows. Temple width, 0.44; head length, 0.52; pronotum width, 0.29; pteronotum width, 0.46. Abdomen with tergites II-VII very deeply indented medioanteriorly, II not completely divided; VIII longer, with slight medioanterior indentation; IX evenly longer. Marginal tergal setae: II, 2; VI, 10; VIII, 4, but with 2 at each lateroposterior corner; IX, 8, but 2 at each lateroposterior corner

and 2 at each lateroanterior corner. Subgenital plate of fused sternites VII–VIII, with posterior margin having series of 10 short setae. Abdomen width, 0.68; total body length, 2.14.

Discussion.—Hopkins and Clay (1952) placed *Q. crassipedalis* in the genus *Brueelia* Kéler with the notation "Referred here doubtfully." When Carriker (1949) described his new species *Quadriceps titicacae*, he compared it with the description and illustration of *Nirmus crassipes* Piaget, 1885. Apparently Hopkins and Clay were unaware of Carriker's referral of this species to the genus *Quadriceps*.

We recently received a series of *Q. crassipedalis* off the type-host, these likely representing the first specimens of this species seen by any mallophagan taxonomist since Piaget. A comparison of these specimens with the illustration by Piaget indicates that they represent the species he described. Apparently Hopkins and Clay based their decision on the fact that the preantennal region of the head is more tapered than other previously known species of *Quadriceps*. To end the confusion concerning the generic status of this species, we have illustrated both sexes and provided descriptive details and measurements which clearly place the species in the genus *Quadriceps*. The details of the male genitalia (Fig. 2), the medially indented abdominal tergal plates, and the shape of the abdominal terminal sternal plates are unique.

Material examined.—1 ♂ and 1 ♀ from *Thinocorus runicivorus* collected September 26, 1981, at Los Salinas, El Convento, Santiago, Chile, by M. A. Marin.

Quadriceps ruficollis Emerson and Price, NEW SPECIES

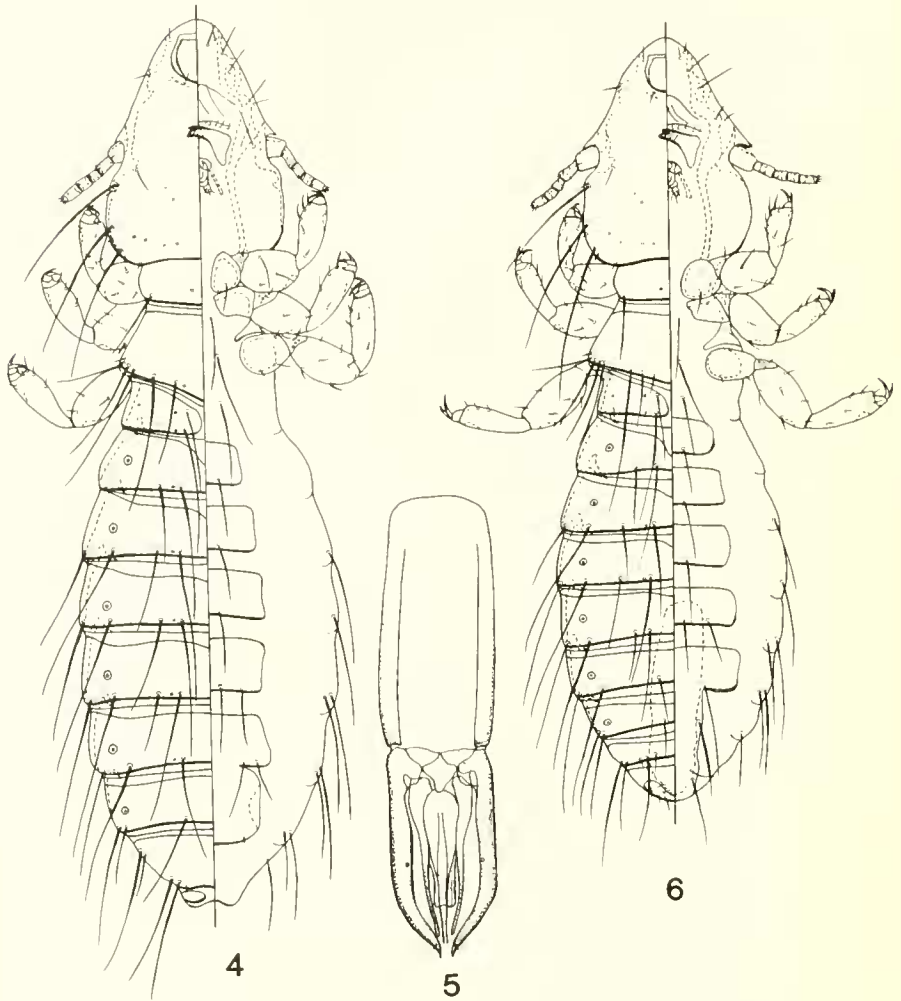
Figs. 4–6

Type-host: *Oreopholus ruficollis* (Wagler), the Tawny-throated Dotterel.

Male.—External morphology and chaetotaxy as in Fig. 6. Much as for *Q. crassipedalis*, except as follows. Dorsal anterior head plate of slightly different shape and size. Temple width, 0.29–0.32; head length, 0.38–0.41. Each side of pteronotum with 6–8 setae. Pronotum width, 0.19–0.20; pteronotum width, 0.27–0.31. Only abdominal tergites III–V with obvious medioanterior indentation. Tergite II with only 2 marginal setae, VIII with 6, and IX with 10, with lengths as shown; without series of very long setae at posterior margin of abdomen. Sternites III–V each with only 2 marginal setae. Subgenital plate with row of lateral setae. Abdomen width, 0.38–0.44; total body length, 1.33–1.43. Genitalia (Fig. 5) with longer, more slender, and more gently curved parameres, and conspicuously different mesosomal structural details; genitalia length, 0.31–0.33; genitalia width, 0.08.

Female.—External morphology and chaetotaxy as in Fig. 4. Likewise, much as for *Q. crassipedalis*, except differing as for male above and as follows. Temple width, 0.34–0.36; head length, 0.44–0.46. Pronotum width, 0.20–0.22; pteronotum width, 0.32–0.35. Only abdominal tergites III–IV with obvious medioanterior indentation. Subgenital plate lacking series of short setae on posterior margin. Abdomen width, 0.46–0.53; total body length, 1.64–1.69.

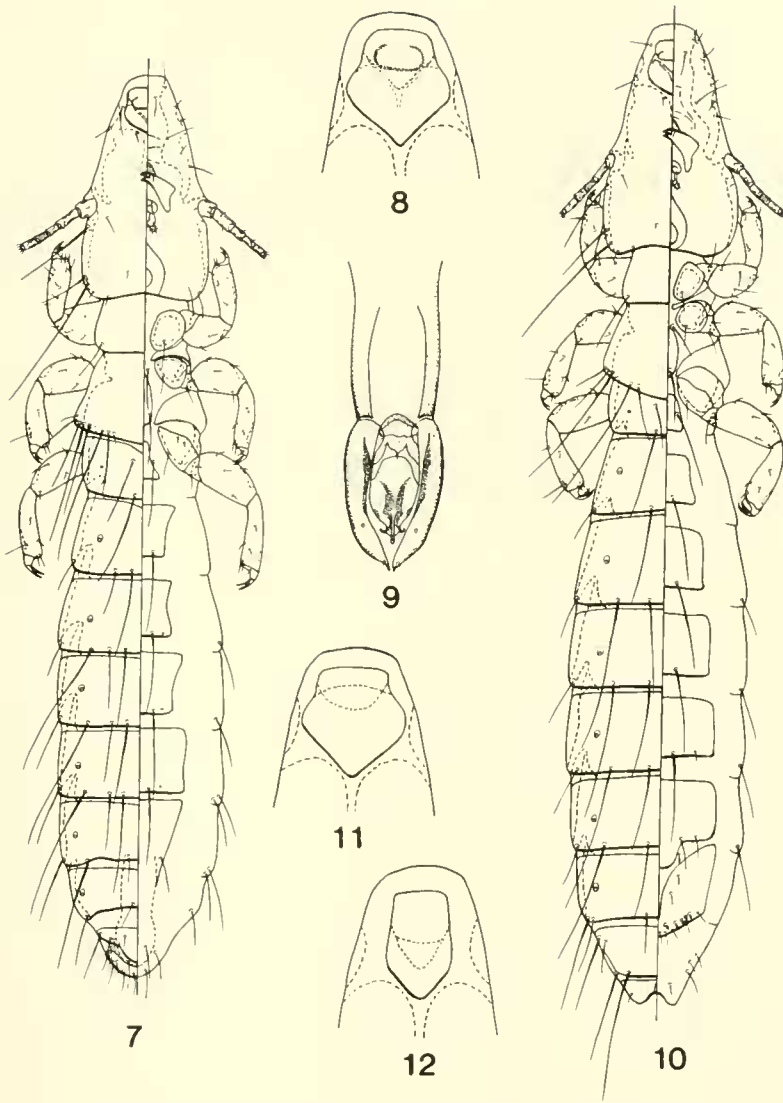
Discussion.—While the head and thorax structures are somewhat similar between *Q. crassipedalis* and this new species, the latter is easily differentiated by being consistently smaller in size and having considerably different abdominal chaetotaxy, degree of indentation of abdominal tergites, and details of the ter-



Figs. 4-6. *Quadriceps ruficollis*. 4, Female. 5, Male genitalia. 6, Male.

minalia and male genitalia. *Q. ruficollis* is also close to *Q. charadrii* (Linnaeus) found on *Pluvialis apricaria* (Linnaeus), the Eurasian Golden Plover. The chaetotaxy, except for terminal abdominal segments, is similar in these two species. The head and abdomen of *Q. ruficollis* in both sexes are wider and not as long as for *Q. charadrii*. The most noticeable differences between these two species are the shape of the dorsal anterior head plate and the details of the male genitalia. The dorsal head plate of *Q. charadrii* has a convex anterior margin, whereas that of *Q. ruficollis* (Figs. 4, 6) is flattened. The male genitalia of *Q. charadrii* are only 0.23 long with stout parameres and a short basal plate, while for *Q. ruficollis* the male genitalia (Fig. 5) are over 0.30 long and have long slender parameres and a longer basal plate.

Material examined.—Holotype ♂ from *Oreopholus ruficollis* collected July 3, 1981, at Punitaqui, Coquimbo, Chile, by M. A. Marin; in the U.S. National



Figs. 7-12. 7-10, *Quadriceps rubricollis*. 7, Male. 8, Male dorsal anterior head plate. 9, Male genitalia. 10, Female. 11, 12, Male dorsal anterior head plate. 11, *Q. boephilus*. 12, *Q. hiaticulae*.

Museum of Natural History. Paratypes: 45 ♂, 64 ♀, same data as holotype; 34 ♂, 21 ♀ from *O. ruficollis* collected on May 1973 at Camino a Punta Blanca Pd. Magdalena, Buenos Aires, Argentina, by A. C. Cicchino.

***Quadriceps rubricollis* Emerson and Price, NEW SPECIES**

Figs. 7-10

Type-host: *Charadrius rubricollis* Gmelin, the Australian Plover.

Male.—External morphology and chaetotaxy as in Fig. 7. Head elongate, narrowed, with slightly flattened anterior margin; dorsal anterior plate heart-shaped,

as in Fig. 8; temple with 1 very long and 2 shorter marginal setae on each side; antennae filiform, with basal segment slightly enlarged; temple width, 0.28–0.29; head length, 0.46–0.47. Pronotum with 1 long seta at each lateroposterior corner; each side of pteronotum with 5–8 short to very long marginal setae; pronotum width, 0.19–0.21; pteronotum width, 0.28–0.30. Abdomen with tergites II–VII of approximately similar size, with II–III slightly indented medioanteriorly; VIII smaller; terminal tergites as shown. Marginal tergal setae: II, 2; III, 6; IV–VI, 8; VII, 6; VIII, 4. Sternal plates on II–VI each with 2 setae. Abdomen width, 0.35–0.37; total body length, 1.88–1.95. Genitalia (Fig. 9) with stout parameres, gently inwardly curved; mesosomal structures as shown; genitalia length, 0.27–0.28; genitalia width, 0.07–0.08.

Female.—External morphology and chaetotaxy as in Fig. 10. Much as for male, except as follows. Temple width, 0.29–0.30; head length, 0.47–0.48. Pronotum width, 0.20–0.22; pteronotum width, 0.29–0.30. Abdominal tergite VIII of much same size as I–VII, with IX only slightly shorter. Marginal tergal setae: III, 4; IV–VIII, 6. Sternal plate on IV with 4 setae; subgenital plate with VII separated from VIII, chaetotaxy as shown. Abdomen width, 0.38–0.40; total body length, 2.03–2.14.

Discussion.—The long slender species of *Quadriceps* found on Plovers of the genus *Charadrius* are in the *hiaticulae* species group. In addition to *Q. rubricollis* described here, the species group includes *Q. hiaticulae* (O. Fabricius) found on *Charadrius hiaticula* Linnaeus and *Q. boeophilus* (Kellogg) found on *C. vociferus* Linnaeus. These three species are easily separated by the shape of the anterior dorsal head plate (Figs. 8, 11, 12). The parameres and the entire male genitalia of *Q. rubricollis* are shorter than those of the other two species. The chaetotaxy and shape of the terminal abdominal segments also differ in each of the three species. *Q. rubricollis* and *Q. hiaticulae* have darkened lateral margins on abdominal segments II–VII, whereas *Q. boeophilus* has median darkened hour-glass shaped areas on abdominal tergites II–VII. Timmermann (1955) described *Q. cucullatus*, the shorter species of *Quadriceps*, from the same type-host as for *Q. rubricollis*, but the differences in size and structure are readily apparent.

Material examined.—Holotype ♂ from *Charadrius rubricollis* collected March 24, 1981, at Ordnance Point, Tasmania, by R. H. Green; in the Queen Victoria Museum, Launceston, Tasmania, Australia. Paratypes: 13 ♂, 8 ♀, same data as holotype.

ACKNOWLEDGMENTS

We thank Manuel A. Marin, Casilla 2974, Santiago, Chile, Armando C. Cicchino, Museo de La Plata, La Plata, Providence de Buenos Aires, Argentina, and Robert H. Green, Queen Victoria Museum, Launceston, Tasmania, Australia, for providing us with the specimens used in this study. This research was partially supported by Project No. Min-17-016, Minnesota Agricultural Experiment Station, St. Paul, Minnesota 55108, and has been assigned Paper No. 13,971, Scientific Journal Series.

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